



## **DEPARTMENT OF TRANSPORTATION**

### **Federal Aviation Administration**

#### **14 CFR Part 39**

**[Docket No. FAA-2022-0160; Project Identifier AD-2022-00009-E]**

**RIN 2120-AA64**

#### **Airworthiness Directives; CFM International, S.A. Turbofan Engines**

**AGENCY:** Federal Aviation Administration (FAA), DOT.

**ACTION:** Notice of proposed rulemaking (NPRM).

**SUMMARY:** The FAA proposes to adopt a new airworthiness directive (AD) for certain CFM International, S.A. (CFM) LEAP-1A model turbofan engines. This proposed AD was prompted by reports of two in-flight shutdowns (IFSDs) and subsequent investigation by the manufacturer that revealed cracks in the high-pressure turbine (HPT) rotor stage 1 blades. This proposed AD would require initial and repetitive borescope inspections (BSIs) of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set. Depending on the results of the BSIs, this proposed AD would require either additional BSIs at reduced intervals or replacement of the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set. This proposed AD would also require sending the inspection results to CFM if any unserviceable finding is found. The FAA is proposing this AD to address the unsafe condition on these products.

**DATES:** The FAA must receive comments on this proposed AD by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

**ADDRESSES:** You may send comments, using the procedures found in 14 CFR 11.43 and 11.45, by any of the following methods:

- Federal eRulemaking Portal: Go to <https://www.regulations.gov>. Follow the instructions for submitting comments.

- Fax: (202) 493-2251.

- Mail: U.S. Department of Transportation, Docket Operations, M-30, West Building Ground Floor, Room W12-140, 1200 New Jersey Avenue SE, Washington, DC 20590.

- Hand Delivery: Deliver to Mail address above between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays.

For service information identified in this NPRM, contact CFM International, S.A., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: (877) 432-3272; email: [aviation.fleetsupport@ge.com](mailto:aviation.fleetsupport@ge.com). You may view this service information at the FAA, Airworthiness Products Section, Operational Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

### **Examining the AD Docket**

You may examine the AD docket at <https://www.regulations.gov> by searching for and locating Docket No. FAA-2022-0160; or in person at Docket Operations between 9 a.m. and 5 p.m., Monday through Friday, except Federal holidays. The AD docket contains this NPRM, any comments received, and other information. The street address for Docket Operations is listed above.

**FOR FURTHER INFORMATION CONTACT:** Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; email: [Mehdi.Lamnyi@faa.gov](mailto:Mehdi.Lamnyi@faa.gov).

### **SUPPLEMENTARY INFORMATION:**

#### **Comments Invited**

The FAA invites you to send any written relevant data, views, or arguments about this proposal. Send your comments to an address listed under ADDRESSES. Include “Docket No. FAA-2022-0160; Project Identifier AD-2022-00009-E” at the beginning of your comments. The most helpful comments reference a specific portion of the proposal, explain the reason for any recommended change, and include supporting data. The FAA will consider all comments received by the closing date and may amend this proposal because of those comments.

Except for Confidential Business Information (CBI) as described in the following paragraph, and other information as described in 14 CFR 11.35, the FAA will post all comments received, without change, to <https://www.regulations.gov>, including any

personal information you provide. The agency will also post a report summarizing each substantive verbal contact received about this NPRM.

### **Confidential Business Information**

CBI is commercial or financial information that is both customarily and actually treated as private by its owner. Under the Freedom of Information Act (FOIA) (5 U.S.C. 552), CBI is exempt from public disclosure. If your comments responsive to this NPRM contain commercial or financial information that is customarily treated as private, that you actually treat as private, and that is relevant or responsive to this NPRM, it is important that you clearly designate the submitted comments as CBI. Please mark each page of your submission containing CBI as “PROPIN.” The FAA will treat such marked submissions as confidential under the FOIA, and they will not be placed in the public docket of this NPRM. Submissions containing CBI should be sent to Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803. Any commentary that the FAA receives which is not specifically designated as CBI will be placed in the public docket for this rulemaking.

### **Background**

The FAA received reports of two single-engine IFSDs on airplanes powered by LEAP-1A model turbofan engines, operating extensively in the Middle East and North Africa (MENA) region. A post-flight BSI of the HPT module revealed that the engine failures were due to cracks in the HPT rotor stage 1 blades. After investigation, the manufacturer determined that engines operating in the MENA region are susceptible to accelerated HPT rotor stage 1 blade deterioration and airfoil distress due to the build-up of dust. This unsafe condition, if not addressed, could result in failure of the engine, in-flight shutdown, loss of thrust control, and loss of the airplane.

### **FAA’s Determination**

The FAA is issuing this NPRM after determining that the unsafe condition described previously is likely to exist or develop on other products of the same type design.

## **Related Service Information under 1 CFR Part 51**

The FAA reviewed CFM Service Bulletin (SB) LEAP-1A-72-00-0461-01A-930A-D, Issue 002-00, dated December 21, 2021. This SB specifies procedures for performing a BSI of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set for LEAP-1A model turbofan engines operating in the MENA region, performing all applicable corrective actions, and reporting any unserviceable results to CFM. This service information is reasonably available because the interested parties have access to it through their normal course of business or by the means identified in ADDRESSES.

## **Proposed AD Requirements in this NPRM**

This proposed AD would require initial and repetitive BSIs of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set and, depending on the results of the inspections, additional BSIs at reduced intervals or replacement of the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set. This proposed AD would also require a BSI of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set installed on the sister engine of the same airplane if certain criteria are met. This proposed AD would also require sending the inspection results to CFM if any unserviceable finding is found.

## **Differences Between this Proposed AD and the Service Information**

The Accomplishment Instructions, paragraphs 5.E.(1)(g)2 and 5.E.(1)(g)3, of CFM SB LEAP-1A-72-00-0461-01A-930A-D, Issue 002-00, dated December 21, 2021, specify removing one engine if certain conditions exist, whereas this proposed AD would require replacement of the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set if certain conditions exist.

## **Interim Action**

The FAA considers that this proposed AD would be an interim action. The inspection reports that would be required by this proposed AD will enable the manufacturer to obtain better insight into the nature, cause, and extent of the cracking, and eventually to develop final action to address the unsafe condition. Once final action has been identified, the FAA might consider additional rulemaking.

## Costs of Compliance

The FAA estimates that this AD, if adopted as proposed, would affect 0 engines installed on airplanes of U.S. registry.

The FAA estimates the following costs to comply with this proposed AD:

### Estimated costs

Action	Labor Cost	Parts Cost	Cost per product	Cost on U.S. operators
BSI the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set	4 work-hours x \$85 per hour = \$340	\$0	\$340	\$0

The FAA estimates the following costs to do any necessary reporting and replacements that would be required based on the results of the proposed inspections. The agency has no way of determining the number of airplanes that might need these replacements.

### On-condition costs

Action	Labor Cost	Parts Cost	Cost per product
Replace the HPT rotor stage 1 blades	150 work-hours x \$85 per hour = \$12,750	\$988,200	\$1,000,950
Replace the HPT stator stage 1 nozzle set	24 work-hours x \$85 per hour = \$2,040	\$701,460	\$703,500
BSI the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set (on the sister engine)	4 work-hours x \$85 per hour = \$340	\$0	\$340
Report BSI results to CFM	1 work-hour x \$85 per hour = \$85	\$0	\$85

## Paperwork Reduction Act

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2120-0056. Public reporting for

this collection of information is estimated to take approximately 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to: Information Collection Clearance Officer, Federal Aviation Administration, 10101 Hillwood Parkway, Fort Worth, TX 76177-1524.

### **Authority for this Rulemaking**

Title 49 of the United States Code specifies the FAA's authority to issue rules on aviation safety. Subtitle I, section 106, describes the authority of the FAA Administrator. Subtitle VII: Aviation Programs, describes in more detail the scope of the Agency's authority.

The FAA is issuing this rulemaking under the authority described in Subtitle VII, Part A, Subpart III, Section 44701: General requirements. Under that section, Congress charges the FAA with promoting safe flight of civil aircraft in air commerce by prescribing regulations for practices, methods, and procedures the Administrator finds necessary for safety in air commerce. This regulation is within the scope of that authority because it addresses an unsafe condition that is likely to exist or develop on products identified in this rulemaking action.

### **Regulatory Findings**

The FAA determined that this proposed AD would not have federalism implications under Executive Order 13132. This proposed AD would not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

For the reasons discussed above, I certify this proposed regulation:

- (1) Is not a "significant regulatory action" under Executive Order 12866,
- (2) Would not affect intrastate aviation in Alaska, and

(3) Would not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

#### **List of Subjects in 14 CFR Part 39**

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

#### **The Proposed Amendment**

Accordingly, under the authority delegated to me by the Administrator, the FAA proposes to amend 14 CFR part 39 as follows:

#### **PART 39 - AIRWORTHINESS DIRECTIVES**

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

#### **§ 39.13 [Amended]**

2. The FAA amends § 39.13 by adding the following new airworthiness directive:

**CFM International, S.A.:** Docket No. FAA-2022-0160; Project Identifier AD-2022-00009-E.

#### **(a) Comments Due Date**

The FAA must receive comments on this airworthiness directive (AD) by [INSERT DATE 45 DAYS AFTER DATE OF PUBLICATION IN THE FEDERAL REGISTER].

#### **(b) Affected ADs**

None.

#### **(c) Applicability**

This AD applies to CFM International, S.A. (CFM) LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, LEAP-1A26E1, LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A model turbofan engines with an installed high-pressure turbine (HPT) rotor stage 1 blade, having part number (P/N) 2747M92P01, P/N 2553M91G03, P/N 2553M91G05, P/N 2553M91G06, P/N 2553M91G07, or P/N 2553M91G08 that has accumulated more than 800 Middle East and North Africa (MENA) takeoffs.

#### **(d) Subject**

Joint Aircraft System Component (JASC) Code 7250, Turbine Section.

**(e) Unsafe Condition**

This AD was prompted by reports of two in-flight shutdowns and subsequent investigation by the manufacturer that revealed cracks in the HPT rotor stage 1 blades. The FAA is issuing this AD to prevent failure of the HPT rotor stage 1 blades. The unsafe condition, if not addressed, could result in failure of the engine, in-flight shutdown, loss of thrust control, and loss of the airplane.

**(f) Compliance**

Comply with this AD within the compliance times specified, unless already done.

**(g) Required Actions**

*(1) Group 1 Engines: Borescope Inspection (BSI) of HPT Rotor Stage 1 Blades and HPT Stator Stage 1 Nozzle Set*

For Group 1 engines with an affected HPT rotor stage 1 blade installed:

(i) Within 100 flight cycles (FCs) after accumulating 800 MENA takeoffs on the HPT rotor stage 1 blade, before the HPT rotor stage 1 blade accumulates 1,750 cycles since new (CSN), or within 100 FCs after the effective date of this AD, whichever occurs later, perform an initial BSI of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set in accordance with the Accomplishment Instructions, paragraphs 5.E.(1)(c) and 5.E.(1)(d), of CFM Service Bulletin LEAP-1A-72-00-0461-01A-930A-D, Issue 002-00, dated December 21, 2021 (the SB).

(ii) Thereafter, at intervals not to exceed 150 FCs since the last BSI, perform a repetitive BSI of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set in accordance with the Accomplishment Instructions, paragraphs 5.E.(1)(c) and 5.E.(1)(d), of the SB.

*(2) Group 2 Engines: BSI of HPT Rotor Stage 1 Blades and HPT Stator Stage 1 Nozzle Set*

For Group 2 engines with an affected HPT rotor stage 1 blade installed:

(i) Within 100 FCs after accumulating 800 MENA takeoffs on the HPT rotor stage 1 blade, before the HPT rotor stage 1 blade accumulates 2,600 CSN, or within 100 FCs after the effective date of this AD, whichever occurs later, perform an initial BSI of



the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set in accordance with the Accomplishment Instructions, paragraphs 5.E.(1)(c) and 5.E.(1)(d), of the SB.

(ii) Thereafter, at intervals not to exceed 300 FCs since the last BSI, perform a repetitive BSI of the HPT rotor stage 1 blades and HPT stator stage 1 nozzle set in accordance with the Accomplishment Instructions, paragraphs 5.E.(1)(c) and 5.E.(1)(d), of the SB.

### *(3) BSI Results Disposition*

Based on the results of the BSI required by paragraph (g)(1) or (2) of this AD, as applicable, either re-inspect or replace the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set using the criteria, compliance times, and procedures referenced in the Accomplishment Instructions, paragraph 5.E.(1)(f), of the SB.

### *(4) Conditional Inspection of the Sister Engine on the Same Airplane*

(i) Based on the BSI results disposition required by paragraph (g)(3) of this AD, if re-inspection or replacement of the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set is required within 50 FCs based on the criteria, compliance times, and procedures referenced in the Accomplishment Instructions, paragraph 5.E.(1)(f), of the SB, then perform the actions required in paragraph (g)(4)(ii) of this AD.

(ii) Within 5 FCs after performing the inspection required by paragraph (g)(1) or (2) of this AD, as applicable, either inspect or replace the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set on the sister engine using the procedures and compliance times in the Accomplishment Instructions, paragraph, 5.E.(1)(g), of the SB. Where the SB specifies to remove the engine, this AD requires replacement of the HPT rotor stage 1 blades or HPT stator stage 1 nozzle set, as applicable.

### *(5) Reporting Requirements*

If, during any inspection required by paragraph (g)(1), (2), (3), or (4) of this AD, as applicable, any HPT unserviceable finding is found on an engine as identified in the Accomplishment Instructions, paragraph 5.E.(1)(f) of the SB, within 30 days of performing the inspection, report the HPT unserviceable finding to CFM in accordance with the Accomplishment Instructions, paragraph 5.E.(1)(f)1, of the SB.

Note 1 to paragraph (g): The Accomplishment Instructions in paragraph 5.E.(1)(f) of the SB reference applicable aircraft maintenance manual tasks for procedures and compliance times for the actions required by paragraphs (g)(3) through (5) of this AD.

**(h) Definitions**

(1) Group 1 engines are CFM LEAP-1A29, LEAP-1A29CJ, LEAP-1A30, LEAP-1A32, LEAP-1A33, LEAP-1A33B2, and LEAP-1A35A model turbofan engines.

(2) Group 2 engines are CFM LEAP-1A23, LEAP-1A24, LEAP-1A24E1, LEAP-1A26, LEAP-1A26CJ, and LEAP-1A26E1 model turbofan engines.

(3) For the purpose of this AD, a “MENA takeoff” is any takeoff accomplished in the MENA region, as defined in the Planning Information, paragraph 3.D., of the SB.

(4) For the purpose of this AD, “sister engine” refers to the other engine installed on the same airplane.

**(i) Alternative Methods of Compliance (AMOCs)**

(1) The Manager, ECO Branch, FAA, has the authority to approve AMOCs for this AD, if requested using the procedures found in 14 CFR 39.19. In accordance with 14 CFR 39.19, send your request to your principal inspector or local Flight Standards District Office, as appropriate. If sending information directly to the manager of the certification office, send it to the attention of the person identified in paragraph (j)(1) of this AD and email to: ANE-AD-AMOC@faa.gov.

(2) Before using any approved AMOC, notify your appropriate principal inspector, or lacking a principal inspector, the manager of the local flight standards district office/certificate holding district office.

**(j) Related Information**

(1) For more information about this AD, contact Mehdi Lamnyi, Aviation Safety Engineer, ECO Branch, FAA, 1200 District Avenue, Burlington, MA 01803; phone: (781) 238-7743; email: Mehdi.Lamnyi@faa.gov.

(2) For service information identified in this AD, contact CFM International, S.A., Aviation Operations Center, 1 Neumann Way, M/D Room 285, Cincinnati, OH 45125; phone: (877) 432-3272; email: aviation.fleetsupport@ge.com. You may view this referenced service information at the FAA, Airworthiness Products Section, Operational

Safety Branch, 1200 District Avenue, Burlington, MA 01803. For information on the availability of this material at the FAA, call (817) 222-5110.

Issued on March 10, 2022.

Lance T. Gant, Director,  
Compliance & Airworthiness Division,  
Aircraft Certification Service.

[FR Doc. 2022-05524 Filed: 3/18/2022 8:45 am; Publication Date: 3/21/2022]